PROPOSED

TEMPORARY COVERED SOURCE PERMIT REVIEW - NO. 0242-01-CT

Significant Modification - Adding five Mobile Crushers and one Cone Crusher
Application No. 0242-06

Applicant: Goodfellow Brothers, Inc.
Facility: 780 TPH Stone Crushing and Screening Plant with 1 MW Diesel Engine Generator

Equipment Location: Various locations throughout the state

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Background:

Goodfellow Brothers, Inc. (GBI) owns and operates a variety of crushers, screens, and conveyors for rock crushing activities. The equipment is used to crush basalt for construction purposes. Materials are batch-dropped into a primary crusher, forwarded via conveyors to either a stockpile or to a secondary and possibly a tertiary crusher. The stockpiles either remain throughout the duration of the project or are moved by a front-end loader.

The equipment is deployed to various locations and may be erected in several different configurations depending on the project requirements. The application covers GBI's entire equipment inventory of crushers, screen trailers, and diesel engine generators. To allow flexibility, the permit will allow several plant configurations, however, no more than one of each type of crusher (primary, secondary, tertiary), one diesel engine generator, three screens, and four storage piles will be allowed at any one project location. Water sprays at the crushers, screens, conveyors, and stockpiles control fugitive dust. All other areas use manual watering to control fugitive dust. Due to the size and manufacture date of the crushers, the crushers are subject to
40 CFR Part 60, Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants.

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Proposed Project:

GBI is proposing to add five mobile crushers and one non-mobile cone crusher to their inventory. The mobile crushers are track-mounted jaw crushers that use an integral diesel engine to power both the drive train and the jaw crusher. Three of the five mobile crushers are 400 TPH jaw crushers. One of the five is a 700 TPH jaw crusher and the other is a 450 TPH cone crusher. These mobile crushers will operate singularly or at most, two will operate at one site. The mobile crushers will not operate with any of the other permitted equipment or any of the diesel engine generators. The diesel engines will be limited to operating 2,000 hours per rolling 12-month period at each site.

The non-mobile cone crusher is rated at 700 TPH. This secondary cone crusher is larger than the any of the currently permitted secondary crushers, so the potential emissions at the non-mobile crushing sites will increase.

Equipment Description:

The following is a list of the equipment currently covered under this temporary covered source permit:

a. 780 TPH Primary Jaw Crusher, Nordberg, model C140B, serial no. C1403124: equipment no. K-129;

b. 780 TPH Primary Jaw Crusher, Nordberg, model C140B, serial no. 34395: equipment no. K-76;

c. 500 TPH Secondary Cone Crusher, Omnicone, model 1560, serial no. 1560-253: equipment no. K-26;

d. 500 TPH Secondary Cone Crusher, Omnicone, model 1560, serial no. 304-300034: equipment no. K-130;

e. 440 TPH Screen Trailer, JCI, model FSG5162-26, serial no. 97H01F32: equipment no. K-27;

f. 440 TPH Screen Trailer, JCI, model 620332, serial no. 96H01F32: equipment no. K-143;

g. 264 TPH Screen, Cedar Rapids, 4'x12'x2, serial no. 1426: equipment no. K-23;

h. 1 MW Diesel Engine Generator, Gen Set, model 3512, serial no. 24Z8717, with a minimum stack height of 17 feet: equipment no. LP-130;

i. 1 MW Diesel Engine Generator, Gen Set, model 3512, serial no. 24Z01234, with a minimum stack height of 17 feet: equipment no. LP-84;

j. 1 MW Diesel Engine Generator, Gen Set, model 3512, serial no. 24Z08458, with a minimum stack height of 17 feet: equipment no. LP-121;

k. Various conveyors; and

l. Various water sprays.

The following equipment are being added under this modification:

a. 400 TPH Mobile Jaw Crusher, Nordberg model no. LT105, serial no. 72742, with Caterpillar Diesel Engine model no. C-9 DITA, serial no. CLS07165, with a minimum stack height of 11.9 feet: equipment no. K-148;

b. 400 TPH Mobile Jaw Crusher, Nordberg model no. LT105, serial no. 72816, with Caterpillar Diesel Engine model no. C-9 DITA, serial no. CLJ07851, with a minimum stack height of 9.9 feet: equipment no. K-149;

c. 400 TPH Mobile Jaw Crusher, Nordberg model no. LT105, serial no. 72839, with Caterpillar Diesel Engine model no. C-9 DITA, serial no. CLJ07851, with a minimum stack height of 10.9 feet: equipment no. K-150;

d. 700 TPH Mobile Jaw Crusher, Nordberg model no. LT110, serial no. 72940, with Caterpillar Diesel Engine model no. C-12 DITA, serial no. BDL04410, with a minimum stack height of 15.9 feet: equipment no. K-151;

e. 450 TPH Mobile Cone Crusher, Nordberg model no. LT300HP, serial no. 72814, with Caterpillar Diesel Engine model no. C-15 DITA, serial no. BEM04965, with a minimum stack height of 16.8 feet: equipment no. K-152;

f. 700 TPH Cone Crusher, Nordberg model no. HP400, serial no. 123450: equipment no. K-153;

Currently, each temporary location is allowed to have any or all of the following equipment:
a. One (1) primary crusher;
b. One (1) secondary crusher;
c. One (1) tertiary crusher;
d. One (1) 1,000 kW diesel engine generator (LP-84, LP-121, LP-130);
e. Three (3) screens;
f. Four (4) storage piles; and
g. Various conveyors.

For the mobile crushers, each temporary location will be allowed to have any or all of the following equipment:

a. One (1) Nordberg Mobile Jaw Crusher (K-148, K-149, K-150, or K-151);
b. One (1) Nordberg Mobile Cone Crusher (K-152);
c. One (1) storage pile; and
d. Various conveyors.

Air Pollution Controls:

Water sprays are located at the crushers, screens, conveyors, and stockpiles to control fugitive dust from the crushing operations. Manual watering, including the use of water trucks, will control fugitive dust from the stockpiles and unpaved roads.

Applicable Requirements:

Hawaii Administrative Rules (HAR):

Chapter 11-59, Ambient Air Quality Standards
Chapter 11-60.1 Air Pollution Control
Subchapter 1, General Requirements
Subchapter 2, General Prohibitions
11-60.1-31 Applicability
11-60.1-32 Visible Emissions
11-60.1-33 Fugitive Dust
11-60.1-37 Process Industries
11-60.1-38 Sulfur Oxides from Fuel Combustion
Subchapter 5, Covered Sources
Subchapter 6, Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
11-60.1-111 Definitions
11-60.1-112 General Fee Provisions for Covered Sources
11-60.1-113 Application Fees for Covered Sources
11-60.1-114 Annual Fees for Covered Sources
11-60.1-115 Basis of Annual Fees for Covered Sources
Subchapter 8, Standards of Performance for Stationary Sources
11-60.1-161 New Source Performance Standards
Subchapter 10, Field Citations

NSPS:

40 CFR, Part 60, Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants - states that stone crushing plants with capacities greater than 25 TPH that commence construction, reconstruction, or modification after August 31, 1983 are subject to the requirements of the subpart. As such, all of the crushers are subject to Subpart OOO.

Synthetic minor:

A synthetic minor is a facility that without limiting conditions, physical or operational, emits above the major triggering levels as defined by HAR 11-60.1-1 for either criteria pollutant(s) or hazardous air pollutant(s). Without operational limits, the diesel engines would be a major source for NO_x. Thus, GBI is a synthetic minor.

Non-Applicable Requirements:

BACT:

A Best Available Control Technology (BACT) analysis is required for each new or modified emissions unit located within a stationary source that has a net emissions increase equal to or greater than the significant levels defined in HAR §11-60.1-1. By definition, an emissions unit is part of a stationary source. A stationary source is a structure, facility, or installation located on one or more contiguous or adjacent properties that are under common ownership or control. Since a stationary source must have a location, each temporary location is a stationary source.

The mobile crushers are new crushers and will not operate with the any of the equipment in GBI's current inventory. As such, for BACT determination, the potential emissions are compared to the BACT trigger levels. The worst-case emissions from a mobile crusher site would be if the 700 TPH primary crusher, equipment no. K-151, and the 450 TPH cone crusher, equipment K-152, operated at one location. Table 1 below shows that for the new mobile crushers, a BACT review is not necessary.

Table 1
Comparison of Net Emissions to Significant Levels for BACT
Two Mobile Crushers with Diesel Engines at One Location

Pollutant	700 TPH Primary Crusher, K-151 (TPY)	450 TPH Cone Crusher, K-152 (TPY)	Net Increase (TPY)	BACT Trigger (TPY)
SO_2	0.8	1.0	1.8	40
NO_x	5.0	7.2	12.2	40
CO	1.2	0.7	1.9	100
VOC[1]	0.1	0.1	0.2	40
PM_{10}	8.1	5.1	13.2	15

1 - total organic compounds (TOC) as volatile organic compounds (VOC)

With the addition of the new 700 TPH cone crusher, the potential emissions at each location will increase because the largest secondary crusher currently operated by GBI is rated at 500 TPH. However, since this is a new unit, the potential emissions from the 700 TPH cone crusher are compared to the BACT trigger levels. Emissions from the 700 TPH crusher were estimated at 0.4 TPY PM_{10}. As shown in Table 2 below, the addition of a larger secondary crusher does not trigger a BACT review.

Table 2
Comparison of Net Emissions to Significant Levels for BACT
Crushing and Screening Plant

Pollutant	700 TPH Cone Crusher (TPY)	BACT Trigger (TPY)
PM_{10}	0.4	15

CAM:

The purpose of Compliance Assurance Monitoring (CAM) is to provide a reasonable assurance that compliance is being achieved with large emissions units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 Code of Federal Regulations, Part 64, for CAM to be applicable, the emissions unit must: (1) be located at a major source; (2) be subject to an emissions limit or standard; (3) use a control device to achieve compliance; (4) have potential pre-control emissions that are 100% of the major source level; and (5) not otherwise be exempt from CAM. Since the facility is not a major source, CAM does not apply.

CERR (Consolidated Emission Reporting Rule):

40 CFR part 51, Subpart A – Emission Inventory Reporting Requirements, determines the annual emissions reporting frequency based on the actual emissions of each pollutant from any individual emission point within the facility that emits at or above the triggering levels. Since the trigger levels are at or above the major source levels and by definition, a temporary source cannot be a major source, the facility is not subject to annual emission reporting under CERR. The Department does however, require facilities to report their annual emissions if the facility-wide emissions exceed the Department's trigger levels. The Department uses the data for in-house recordkeeping purposes. Table 3 below summarizes the Department's trigger levels and illustrates the facility's applicability.

Table 3
Comparison of Emissions to CAB Trigger Levels

pollutant	780 TPH plant 2,000 hrs (TPY)	CAB trigger (TPY)
PM_{10}	17	25
SO_x	5.8	25
NO_x	36.6	25
VOC[1]	1.0	25
CO	9.7	250

1 - total organic compounds (TOC) as volatile organic compounds (VOC)

NESHAP/MACT:

Stone processing is not a NESHAP source.

40 CFR 63, Subpart ZZZZ National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines is not applicable to the diesel engines because the facility is not a major source of HAPs.

PSD:

PSD does not apply since this facility is not a major source.

Insignificant Activities/Exemptions:

No insignificant activities were identified.

Alternate Operating Scenarios:

No new alternate operating scenarios were proposed. Currently, GBI is allowed to use a temporary replacement for their diesel engine generators should one of them unexpectedly go out-of-service.

Project Emissions:

Mobile crushers K-148, K-149, and K-150 use the same Caterpillar diesel engine, model C-9. Mobile crusher K-151 uses a Caterpillar model C-12 diesel engine and mobile crusher K-152 uses a Caterpillar model C-15 diesel engine. Emissions of NO_x, TOC, CO, and PM_{10} were estimated by using the performance data from Caterpillar. Emissions of SO_2 and aldehydes were estimated using AP-42 section 3.3, revised 10/96. HAP emissions were also estimated using AP-42 section 3.3. Table 4 below summarizes the emissions from the crushing operations and the diesel engines of the mobile crushers. Detailed emission calculations can be found in the appendix.

Table 4
Facility-wide Emissions for the Mobile Plant with the Maximum Allowed Equipment

Pollutant	700 TPH Primary Crusher, K-151 (TPY)	450 TPH Cone Crusher, K-152 (TPY)	Unpaved Roads 15,000 VMT (TPY)	Facility-wide 2,000 hrs (TPY)
SO_2	0.8	1.0	--	1.8
NO_x	5.0	7.2	--	12.2
CO	1.2	0.7	--	1.9
VOC[1]	0.1	0.1	--	0.2
PM_{10}	8.1	5.1	7.5	20.7

1 - total organic compounds (TOC) as volatile organic compounds (VOC)

Emissions from the 780 TPH plant were estimated with the new secondary crusher and the maximum amount of equipment allowed at any temporary location. Emissions for the diesel engine were estimated using AP-42 section 3.3, revised 10/96. Emissions for the crushing operation were estimated using AP-42 section 11.19.2, revised 1/95. The emission factor for the storage piles was derived using AP-42 section 13.2.4, revised 1/95. Table 5 below summarizes the maximum emissions from a non-mobile plant. Detailed emission calculations can be found in the appendix.

Table 5
Facility-wide Emissions for the Non-Mobile Plant with the Maximum Allowed Equipment

Pollutant	780 TPH plant 2,000 hrs (TPY)	1 MW DEG 2,000 hrs (TPY)	Unpaved Roads 15,000 VMT (TPY)	Facility-wide 2,000 hrs (TPY)
SO_2	--	5.8	--	5.8
NO_x	--	36.6	--	36.6
CO	--	9.7	--	9.7
VOC[1]	--	1.0	--	1.0
PM_{10}	17	0.7	7.5	25.2

1 - total organic compounds (TOC) as volatile organic compounds (VOC)

Air Quality Assessment:

The applicant performed an Ambient Air Quality Impact Analysis (AAQIA) using the U.S. USEPA recommended air quality model ISCST3 with screening meteorological data. Receptor arrays with 30 meter spacing were generated from USGS DEM data for each site. The following assumptions were used in the analysis;

1. Simple and complex terrain;
2. Rural dispersion;
3. SCREEN3 default met data;
4. Scaling factors of 0.9, 0.7, 0.4, and 0.2 for the 3-hour, 8-hour, 24-hour, and annual concentrations, respectively.

Table 6 below lists the emission rates and stack parameters used in the analysis.

Table 6
Emission Rates and Stack Parameters

Unit	Emission Rates (g/s)				Stack Parameters			
	NOx	SO_2	PM10	CO	Height (m)	Diameter (m)	Velocity (m)	Temperature (°K)
K-148	0.498	0.132	0.008	0.079	3.66	0.102	105.8	696
K-149	0.498	0.132	0.008	0.079	3.05	0.102	105.8	696
K-150	0.498	0.132	0.008	0.079	3.35	0.102	105.8	696
K-151	0.631	0.181	0.014	0.152	4.88	0.127	94.4	763
K-152	0.907	0.227	0.010	0.089	5.18	0.152	81.7	752

Separate model runs were made for each mobile crusher. Runs were also made for the two possible combinations of primary and cone mobile crushers. The two combinations are:

1. One of the three 400 TPH primary crushers, LT105 (K-148, 149, and 150) operating with the 450 TPH cone crusher, LT300HP (K-152) and
2. The 700 TPH primary crusher, LT110 (K-151) operating with 450 TPH cone crusher, LT300HP (K-152).

For the 400 TPH primary crushers, equipment no. K-149 was used in the analysis because it has the shortest stack of the three LT105 crushers. Table 7 below shows the results of the modeling runs.

Table 7
ISCST3 Model Results

Model Run	Modeled Concentrations ($\mu g/m^3$)										
	1-hr				3-hr	8-hr	24-hr		Annual		
	NO_x	SO_2	PM10	CO	SO_2	CO	SO_2	PM10	NO_x[1]	SO_2	PM10
K-148	1584	421	24.1	253	378.9	177	168.4	9.6	54.2	19.2	1.10
K-149	1680	446.6	25.5	268	402.0	188	178.7	10.2	57.5	20.4	1.17
K-150	1588	422.0	24.1	253	379.8	177	168.8	9.6	54.5	19.3	1.10
K-149/K-152 (flat)	1369	364	20.8	218	328	153	146	8.3	46.9	16.6	0.90
K-151/K-152 (elevated)	1752	485	33.2	353	437	247	194	13.3	60.0	22.2	1.5

1 - NO_x concentrations include adjustments for annual throughput limits and EPA tier 1 factor of 0.75

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Since GBI is requesting to operate the crushers on any island, the highest background concentrations throughout the state were used in the analysis. Background air quality data used in the analysis was obtained from the Department's 2004 Annual Summary of the Hawaii Air Quality Data. Table 8 below lists the monitoring stations and background concentrations used.

Table 8
Background Values

Pollutant	Averaging Period	Background ($\mu g/m^3$)	Monitoring Station
NO_x	Annual	9	Kapolei
SO_2	3-hour	427	Hilo
	24-hour	107	Hilo
	Annual	8	Kona
PM10	24-hour	65	Kihei
	Annual	19	Kihei
CO	1-hour	3,762	University
	8-hour	2,323	University

The tables below summarize the potential impacts when background concentrations are included. As shown, it is predicted that the operation of the crushers will not exceed the state or national ambient air quality standards (SAAQS/NAAQS).

Table 9
Predicted Impacts from K-148

		Concentration ($\mu g/m^3$)			
Pollutant	Averaging Period	ISCST3 Model	Background	Total	% SAAQS
NO_x	Annual	54.2	9	63	90
SO_2	3-hour	379	427	806	62
	24-hour	168	107	275	75
	Annual	19.2	8	27	34
PM10	24-hour	9.6	65	75	50
	Annual	1.1	19	20	40
CO	1-hour	253	3,762	4,015	40
	8-hour	177	2,323	2,500	50

1 - NO_x concentrations include adjustments for annual throughput limits and EPA tier 1 factor of 0.75

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Table 10
Predicted Impacts from K-149

		Concentration ($\mu g/m^3$)			
Pollutant	Averaging Period	ISCST3 Model	Background	Total	% SAAQS
NO_x	Annual	57.5	9	66.5	95
SO_2	3-hour	402	427	829	64
	24-hour	179	107	286	78
	Annual	20.4	8	28.4	36
PM10	24-hour	10.2	65	75.2	50
	Annual	1.17	19	20.2	40
CO	1-hour	268	3,762	4,030	40
	8-hour	188	2,323	2,511	50

1 - NO_x concentrations include adjustments for annual throughput limits and EPA tier 1 factor of 0.75

Table 11
Predicted Impacts from K-150

		Concentration ($\mu g/m^3$)			
Pollutant	Averagin g Period	ISCST3 Model	Background	Total	% SAAQS
NO_x	Annual	54.4	9	63.4	91
SO_2	3-hour	380	427	807	62
	24-hour	169	107	276	76
	Annual	19.3	8	27.3	34
PM10	24-hour	9.6	65	74.6	50
	Annual	1.1	19	20.1	40
CO	1-hour	253	3,762	4,015	40
	8-hour	177	2,323	2,500	50

1 - NO_x concentrations include adjustments for annual throughput limits and EPA tier 1 factor of 0.75

Table 12
Predicted Impacts from K-149 and K-152

		Concentration (µg/m^3)			
Pollutant	Averaging Period	ISCST3 Model	Background	Total	% SAAQS
NO_x	Annual	46.9	9	55.9	80
SO_2	3-hour	328	427	755	58
	24-hour	146	107	253	69
	Annual	16.6	8	24.6	31
PM10	24-hour	8.3	65	73.3	49
	Annual	0.9	19	19.9	40
CO	1-hour	218	3,762	3,980	40
	8-hour	153	2,323	2,476	50

1 - NO_x concentrations include adjustments for annual throughput limits and EPA tier 1 factor of 0.75

Table 13
Predicted Impacts from K-151 and K-152

		Concentration (µg/m^3)			
Pollutant	Averaging Period	ISCST3 Model	Background	Total	% SAAQS
NO_x	Annual	60	9	69	99
SO_2	3-hour	468	427	895	69
	24-hour	208	107	315	86
	Annual	23.7	8	31.7	40
PM10	24-hour	13.9	65	78.9	53
	Annual	1.6	19	20.6	41
CO	1-hour	367	3,762	4,129	41
	8-hour	257	2,323	2,580	52

1 - NO_x concentrations include adjustments for annual throughput limits and EPA tier 1 factor of 0.75

Conclusion and Recommendation:

GBI is proposing to increase their inventory of equipment by adding five mobile crushers and one cone crusher. The emission estimates and modeling predict that the facility will remain a non-major source and will operate within the limits of the ambient air quality standards. To ensure compliance, the operating hours will be monitored by the use of a non-resetting hour meter on the diesel engines. Air pollution controls at the facility consist of water sprays at various locations.

Issuance of a Temporary Covered Source Permit is recommended based on the review of the information provided by the applicant and the conservative nature of the calculations.

Appendix

Emissions Calculations